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CONTRIBUTIONS FROM THE CRYPTOGAMIC LABORATORY OF  
HARVARD UNIVERSITY. — XLV.

PRELIMINARY DIAGNOSES OF NEW SPECIES OF  
LABOULBENIACEAE. — III.

BY ROLAND THAXTER.

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DURING the summer of 1900 I took occasion to visit Berlin in order to examine the collections of insects at the Museum of Natural History there in search of Laboulbeniaceae, and through the courtesy of the director, Professor Moebius, and of the staff of the Entomological Laboratories, to whom I desire in this connection to express my great obligations, was successful in obtaining numerous new and interesting forms from all parts of the world. To the great kindness of Dr. David Sharp of Cambridge, England, I am further indebted for the privilege of examining, for a similar purpose, his magnificent collections, especially of Staphylinidae and Gyrinidae, as well as the large series of singular Carabidae brought from the Hawaiian Islands by Mr. Perkins. A considerable number of new or peculiar forms have moreover been added to the American flora since my return, for a portion of which I am indebted to Mr. Charles Bullard, who has very kindly placed his material at my disposal. The number of new forms from all sources thus combines to make a notable addition to the family as a whole, and indicates that my former estimates of its numerical importance were by no means exaggerated.

Among the most interesting of these novelties are those which have been derived from dipterous insects, since they not only enlarge our systematic knowledge of new or little known genera, but illustrate in a striking manner the curiously variable relation of these parasites to such soft-bodied hosts. That so considerable a number of species were found on Diptera is in a great measure due to Professor Dahl, who called my attention to the fact that some of the small flies collected by him at Ralum in New Pomerania, near New Guinea, were parasitized, and I was thus led to make a careful examination of the whole collection

with the results hereafter indicated. These dipterous parasites alone are included in the present paper; but descriptions of the remaining novelties will be published shortly. A set of duplicate preparations of all the material found at Berlin has been made, and will be deposited there as soon as the illustrations for the Supplement to my Monograph, which is in preparation, are completed.

A majority of the following forms belong, as will be observed, to *Stigmatomyces*, a distinctly dipterophilous genus, which must certainly prove very large and widely distributed. That it is at the same time very difficult from a systematic standpoint is evident from the material studied, and few single characters, even of the appendages, seem to be wholly reliable. In describing the species the two superposed cells above the foot are regarded as constituting the receptacle, the upper bearing the stalk-cell of the perithecium terminally, and that of the appendage laterally, in mature individuals; the appendage proper consisting of a more or less distinctly differentiated basal cell, which may or may not bear antheridia like the series of fertile cells superposed above it; the antheridia, though often single, are more often asymmetrically paired. The American species were obtained from small flies in part collected for me by Mr. W. T. Clarke at Berkeley, California, and in part by myself at Kittery Point, Maine, or in the vicinity of Cambridge during September, for the determination of which I am indebted to the kindness of Mr. D. W. Coquillett. The remainder, with the exception of the single African species on *Diopsis*, were all obtained from the Ralum collections of Professor Dahl already referred to.

*Stigmatomyces rugosus* nov. sp.

Venter of the perithecium dark amber brown, roughened by about ten transverse more or less irregular and sometimes anastomosing darker ridges formed by irregular wart-like elevations; evenly oval or elliptical, and abruptly distinguished from the rather stout neck, which is usually bent outward and about equal to it in length or somewhat shorter, distally distinctly enlarged, especially posteriorly; the tip beyond this enlargement abruptly somewhat narrower; the apex asymmetrical, the three posterior lip-cells forming three corresponding projections, rounded or bluntly pointed and more prominent than the bilobed papilla formed below them by the anterior lip-cells. Stalk-cell of the appendage small, subtriangular, amber brown, abruptly prominent below the relatively large dark brown basal cell, which, though narrower, nearly equals it in size, may or may not bear antheridia, and has a well-marked annular

thickening on the inner side of its wall at the base ; the fertile cells above it, four or five in number, bearing the rather large antheridia in pairs ; the series becoming obliquely lateral or external, the free necks strongly curved outward. The cells of the receptacle nearly equal, or the upper larger; the basal cell tapering to the foot and distally slightly broader than the subbasal cell. Spores about  $40 \times 4 \mu$ . Perithecium: venter  $72 \times 45 \mu$ ; neck  $62-72 \times 15-18 \mu$ . Appendage proper  $60-70 \mu$ , stalk-cell  $18 \mu$ . Receptacle  $90-100 \times 20 \mu$ . Total length to tip of perithecium  $250-290 \mu$ .

On the legs, thorax, and abdomen of a minute fly. Berlin Museum, No. 1296. Ralum, New Pomerania.

A form from the same locality occurring on a small blackish fly, and also characterized by a roughened perithecium, differs in several points from that above described; but a description of this, as well as of a closely allied form from Kittery Point, Maine, is withheld for the present.

#### *Stigmatomyces Diopsis* nov. sp.

Colorless or slightly yellowish. Venter of the perithecium long-oval or elliptical, pale reddish amber, rather abruptly distinguished from the paler neck, which tapers but slightly, except at its base, is straight or slightly bent, and traversed by four broad longitudinal ridges which are corrugated by about six successive elevations and depressions; a seventh distal elevation, larger and more prominent than the rest, is present just below the tip, which is abruptly narrower and slightly curved; the apex asymmetrical, the posterior lip-cells forming a tripapillate prominence, the middle papilla larger and more prominent; the anterior lip-cells forming two small lateral papillae placed side by side in such a position that the apex appears to be laterally notched. Appendage erect or somewhat divergent, straight or slightly curved backward, the stalk-cell more than twice as long as broad, and more than half united to the subtriangular stalk-cell of the perithecium, distally constricted at its junction with the well differentiated squarish amber-brown sterile basal cell of the appendage proper; the eight or nine fertile cells above bearing for the most part two antheridia each, the series of antheridia external in the mature types. Spores about  $40-45 \times 5 \mu$ . Perithecium: venter  $80-87 \times 50 \mu$ ; neck  $72-82 \times 18 \mu$ . Appendage proper  $70-75 \mu$ , stalk-cell  $25-30 \mu$ . Receptacle  $75 \mu$ . Total length to tip of perithecium  $270-290 \mu$ .

On *Diopsis* sp., Berlin Museum, No. 860. Bismarckburg, Togo, West Africa. On the upper surface of the abdomen near the tip.

**Stigmatomyces Scaptomyzae nov. sp.**

Venter of the perithecium becoming reddish amber brown, nearly isodiametric, becoming distally enlarged; the nearly hyaline neck very abruptly distinguished, slender, straight, or curved, its lower third sometimes narrower; the tip hardly or not at all differentiated; the apex asymmetrical, the anterior lip-cells forming two lateral papillate slightly divergent protrusions, the posterior lip-cells forming two similar protuberances above them, between which a slight projection may or may not be present. Stalk-cell of the appendage elongate, very abruptly broader than the very small deep brown squarish infertile basal cell; the fertile cells usually five in number, the antheridia with short curved divergent necks and produced in pairs, except the terminal one, which is conspicuously spiniferous, the whole series usually obliquely external. Receptacle hyaline, the basal cell mostly larger, longer, tapering below. Spores about  $36 \times 3.5 \mu$ . Perithecium: venter  $90-100 \times 36-44 \mu$ ; neck  $108 \times 10-15 \mu$ . Appendage  $47-55 \mu$ , the stalk-cell  $25-30 \mu$ . Receptacle  $65-100 \mu$ . Total length to tip of perithecium  $300-325 \mu$ .

On the abdomen and legs of *Scaptomyza graminum* Fallen. Kittery Point, Maine, vicinity of Cambridge, Mass., Berkeley, California.

**Stigmatomyces Limnophorae nov. sp.**

Venter of the perithecium relatively small, amber brown, the wall-cells becoming powdered by a darker maculation and separated by a corresponding number of well-defined unmodified longitudinal ridges which run somewhat obliquely and end, not abruptly, at the base of the neck: the latter generally slender, strongly bent throughout or even recurved, abruptly differentiated, sometimes of less diameter than the tip, which is distinguished from the rest of the neck by an abrupt enlargement more prominent anteriorly; the apex (in the not wholly mature types) unmodified, blunt, slightly oblique. Stalk-cell of the appendage rather prominently rounded externally, but not protruding abruptly below the basal cell, which nearly equals it in length and is slender, slightly larger distally, its base hyaline, its wall, which is dark amber brown above, becoming gradually thicker, so that the lumen of the cell is attenuated below, distally bearing two antheridia; the fertile cells above it, usually seven in number, forming a series outwardly recurved, the terminal cell apparently sterile, the two small cells below it bearing each a single antheridium, while the remainder bear two; the antheridia with short, broad, slightly recurved necks. Receptacle relatively large, hyaline, the basal cell ta-

pering slightly downward, the subbasal cell slightly longer and much broader distally. Perithecium: venter  $55 \times 30 \mu$ ; neck  $75 \times 10 \mu$ . Appendage about  $75-80 \mu$ , stalk-cell  $28 \mu$ . Receptacle  $110 \times 25 \mu$ . Total length to tip of perithecium  $250-275 \mu$ .

On the inferior surface of the abdomen and at the base of the posterior legs of a species of *Limnophorus*. Berkeley, California.

***Stigmatomyces constrictus* nov. sp.**

Venter of the perithecium dark amber brown, subrectangular, or more or less inflated; the short stout neck about equal to it in length, very abruptly distinguished beyond the four rounded elevations which mark the distal ends of the brown wall-cells of the venter, subconical, with a considerable submedian enlargement often more prominent posteriorly; the tip often tapering to the five-papillate apex, the middle posterior papilla blunt and more prominent, the other four nearly symmetrical. Stalk-cell of the appendage often suboblong and externally prominent throughout its length; the basal cell narrower and longer, separated from it by a rather deep constriction and bearing one or two antheridia distally; while above it the two remaining fertile cells are very small, each bearing two antheridia; the series surmounted by a spiniferous antheridium, all the antheridia relatively large and almost free. Receptacle hyaline, its basal cell more or less elongate, tapering to a narrow base, a rectangular distal thicker walled portion separated by a thin incomplete septum; the subbasal cell much shorter, more or less abruptly and prominently inflated at its base, sometimes slightly also at its distal end, and having a more or less well defined median constriction, below which the inflated base may be separated by a thin partial septum. Perithecium: venter  $54 \times 30-40 \mu$ ; neck  $44-55 \times 18 \mu$ . Appendage  $43-50 \mu$ , the stalk-cell  $18 \mu$ . Receptacle  $70-90 \times 22 \mu$ . Total length to tip of perithecium  $200-300 \mu$  (those on the tips of the legs much smaller,  $180-200 \mu$ ).

On the legs and abdomen of a small fly. Ralum, New Pomerania. Berlin Museum, No. 1294.

***Stigmatomyces humilis* nov. sp.**

Venter of the perithecium amber brown, slightly inflated throughout and slightly asymmetrical; the neck rather abruptly distinguished, concolorous, but paler distally, generally shorter than the venter, stout, tapering to the blunt, hardly differentiated apex; about one third of its length taken up by the tip, which is distinguished from it by a slight broad constriction; the outer basal cells subequal and irregularly promi-

nent. Appendage relatively rather slender, very long, sometimes extending nearly to the middle of the neck of the perithecium, the stalk-cell separated by a slight constriction from the basal cell, which is relatively large, the annular thickening about the base on the inner side of its wall unusually well developed, amber brown, bearing two antheridia; the sub-basal cell almost as large, bearing two antheridia, the two successive cells above it smaller and bearing each a single antheridium; the series completed by a single terminal antheridium; the antheridial necks rather slender, and tapering, somewhat appressed. Receptacle short, stout, the cells subequal. Spores about  $28 \times 3 \mu$ . Perithecium: venter  $46-55 \times 32-37 \mu$ ; neck  $45-47 \mu$ . Appendage  $65-75 \mu$ , the stalk-cell  $18 \mu$ . Receptacle  $55 \mu$ . Total length to tip of perithecium  $175 \mu$ .

On the superior surface near the tip of the abdomen of a muscid somewhat larger than the other hosts from Ralum, New Pomerania. Berlin Museum, No. 1287.

*Stigmatomyces dubius* nov. sp.

Amber brown with the exception of the receptacle and the stalk-cell of the perithecium. Venter of the perithecium slightly inflated, relatively small, not abruptly differentiated from the broad neck, which gradually enlarges distally below the rather abruptly tapering, slightly bent tip; the middle of the three posterior projections from the lip-cells larger and longer than the others and bent over so as to overlap the anterior lip-cells, which are curved abruptly toward it; the two lateral posterior projections prominent beyond the base of the middle one, rather slender, and slightly curved inward. Stalk-cell of the appendage distally darker, abruptly prominent below the basal cell, which is small, squarish, and deeper brown; the rest of the appendage, which is unusually long, apparently proliferous above the spiniferous cell, extending beyond the venter of the perithecium, is made up of about eight cells, which bear rather long antheridia in pairs, their necks appressed usually in a lateral series. Receptacle relatively large, hyaline, the subbasal cell much longer and broader than the basal cell, which tapers but slightly to the small foot. Spores  $30 \times 3.5 \mu$ . Perithecium: venter  $58 \times 40 \mu$ ; neck  $110 \times 25 \mu$ . Appendage  $80-95 \mu$ , stalk-cell  $25-32 \mu$ . Receptacle  $145-185 \times 25-30 \mu$ . Total length  $350-375 \mu$ .

On a fly with monstrously developed anterior legs resembling those of *Ochtheria mantis*. Ralum, New Pomerania. Berlin Museum, No. 1281 and 1298. On the head and at the base of the posterior legs.

*Stigmatomyces gracilis* nov. sp.

Form long and slender. Venter of the perithecium amber brown, relatively large above its narrow base, more or less inflated, often more distinct distally; the neck usually straight, sometimes curved, nearly hyaline as a rule, and abruptly distinguished; the tip abruptly but slightly narrower above a prominent and usually symmetrical inflation; the median posterior projection of the lip-cells erect, larger, and slightly more prominent than the two lateral ones, which diverge slightly and are nearly symmetrical with the two anterior ones. Stalk-cell of the appendage slightly prominent distally below the dark amber-brown basal cell, which may be more than half as large, bearing one or two antheridia; the remaining cells four in number, relatively large, except the fourth, which bears a large, curved, conspicuous spine below the base of the terminal antheridium; the antheridia in pairs, lateral or obliquely external, the necks short, becoming pointed and slightly divergent. Receptacle usually rather long and slender, straight or curved, hyaline; the two cells about equal, or the upper larger and distally often broader than the combined diameters of the cells above it. Spores  $45 \times 3.5 \mu$ . Perithecium: venter  $85-90 \times 30-40 \mu$ ; neck  $100-110 \times 16 \mu$  (the enlargement  $\times 20 \mu$ ). Appendage  $70-75 \mu$ , stalk-cell  $18-25 \mu$ . Receptacle  $90-125 \times 18-20 \mu$ . Total length to tip of perithecium  $250-360 \mu$ .

On the same host with *S. dubius*. Ralum, New Pomerania. Berlin Museum, No. 1298. Near the tips of the posterior legs.

*Stigmatomyces proboscideus* nov. sp.

Venter of the perithecium amber brown, sometimes more than twice as long as broad, usually but slightly inflated, often more so distally; the neck lighter brown, rather abruptly distinguished, relatively very stout, elongate, nearly isodiametric, usually curved throughout; the short tip abruptly somewhat narrower, the apex broad and blunt without well developed elevations. Stalk-cell of the appendage brown, relatively small and short, slightly prominent distally; the basal cell broader than long, the five fertile cells above it rather short and stout, the series curved sidewise, the antheridia lateral in pairs. Spores about  $30 \times 3 \mu$ . Perithecium: venter  $75-95 \times 32-36 \mu$ ; neck  $135-185 \times 18-22 \mu$ . Appendage  $55-72 \mu$ , stalk-cell  $18 \mu$ . Receptacle  $110-125 \times 29 \mu$ . Total length to tip of perithecium  $400 \mu$ .

On the abdomen of a small fly. Ralum, New Pomerania. Berlin Museum, No. 1288.



**Stigmatomyces Hydrelliae nov. sp.**

Venter of the perithecium amber brown, oval, the wall-cells becoming separated by well-defined, slightly oblique longitudinal broad ridges, which become broader distally where they end abruptly; the neck pale, well distinguished, its middle third prominently inflated, more so posteriorly, and separated from the usually abruptly bent tip by a constriction; the apex rounded, one of the (lateral?) lip-cells forming a slender, bluntly pointed, well-defined free projection. Stalk-cell of the appendage sub-triangular, somewhat prominent below the basal cell, which nearly equals it in length, sterile; the fertile cells above it nearly equal, bearing rather large, apparently single, antheridia, with stout, straight necks, the series ending in a terminal spiniferous antheridium. Receptacle hyaline, the two cells nearly equal in length, the lower tapering below, the upper broader inflated, its diameter greater than the base of the perithecium and stalk-cell combined, so that the latter region appears to be constricted. Spores  $28 \times 2 \mu$ . Perithecium: venter  $50-55 \times 33-40 \mu$ ; neck  $40-43 \mu$ . Appendage  $50 \mu$ , the stalk-cell  $18 \mu$ . Receptacle  $55-65 \times 20-22 \mu$ . Total length to tip of perithecium  $150-185 \mu$ .

On the superior surface of the abdomen, sometimes on the legs of *Hydrellia* sp. Kittery Point, Maine. Occurring in scattered groups.

**Stigmatomyces purpureus nov. sp.**

Becoming wholly suffused with purple. Venter of the perithecium inflated toward the base, tapering distally; the four wall-cells separated by a corresponding number of prominent longitudinal ridges, rounded in section, which run spirally, making in well-developed individuals a whole half turn about the venter, and becoming sometimes lobulated through the presence of successive constrictions and enlargements; neck not abruptly distinguished, except by the abrupt elevations which form the terminations of the longitudinal ridges of the venter, rather slender, an abrupt posterior subterminal elevation preceded by a slight constriction, the tip distally quite hyaline; the apex becoming furcate through the presence of an anterior (shorter) and a posterior projection. Stalk-cell of the appendage relatively small, but slightly prominent below the basal cell, which is nearly as long, sterile, and, as a rule, followed by three cells bearing antheridia singly or in pairs, the terminal one spiniferous. Receptacle usually straight, the cells nearly equal or the upper larger. Spores  $35 \times 3 \mu$ . Perithecium: venter  $80-100 \times 45-50 \mu$ ; neck  $80-83 \mu$ . Appendage  $55 \mu$ , the stalk-cell  $18 \mu$ . Receptacle  $100-120 \mu$ . Total length to tip of perithecium  $200-325 \mu$ .

On all parts of *Scatella stagnalis* Fallen. Kittery Point, Maine, and vicinity of Cambridge, Mass., September. Fully developed individuals with the typical structure are uncommon, a majority of the numerous specimens examined having the color dull or paler purplish, the ridges less well defined, without lobulations and with less than a half twist; the neck and apex hardly, if at all, modified. The same host is infested by an amber-brown form which may prove a mere variety of that above described, being scarcely distinguishable structurally from the less well-marked individuals of this species, the type form of which is, from its remarkable color and the structure of its perithecium, one of the most peculiar members of the genus.

***Stigmatomyces spiralis* nov. sp.**

Venter of the perithecium relatively long and slender, flask shaped, or more often but slightly if at all inflated, the granular wall-cells distinguished by a corresponding number of abrupt, narrow, longitudinal prominent ridges, which become minutely roughened, and are spirally twisted so as to describe a full half turn; the neck concolorous, distinguished by the abruptly elevated and abruptly broadened terminations of the longitudinal ridges of the venter, as long as or slightly shorter than the venter, slightly curved or sometimes straight, nearly cylindrical or slightly tapering; the tip slightly but abruptly narrower, relatively short, somewhat asymmetrical; the apex nearly symmetrical, four papillae being arranged about a somewhat more prominent central projection. Appendage rather short and stout, distinctly broadened in the middle, the stalk-cell stout, the basal cell half as large, or less, and fertile; the series of six to eight fertile cells above it surmounted by a single antheridium, and distinguished by slight successive constrictions, broad and much flattened, each bearing a single antheridium, the fifth furnished with a very sharp spine; the antheridia forming a usually lateral series, their necks becoming strongly curved. Receptacle elongate, slender, becoming brownish or yellowish, the upper cell often more than twice as long as the basal. Spores  $22 \times 2.5 \mu$ . Perithecium: venter  $90-165 \times 35-47 \mu$ ; neck  $90-160 \times 17 \mu$  (the tip  $25-30 \mu$ ). Appendage  $40-50 \mu$ , the stalk-cell  $15 \mu$ . Receptacle  $100-250 \times 15 \mu$ . Total length to tip of perithecium  $350-600 \mu$  (average  $500-550 \mu$ ).

On *Hydrina* sp., Kittery Point, Maine. Usually on the upper surface of the thorax, less often on the legs and elsewhere.

*Stigmatomyces Limosinae* nov. sp.

Perithecium amber brown, the venter slightly inflated, the neck not abruptly distinguished, tapering slightly; the tip usually abruptly narrower, the posterior lip-cells forming an inconspicuous irregular truncate or rounded bilobed projection somewhat more prominent than a similar projection formed by the anterior lip-cells; basal cells relatively very large, forming a short, well-defined stalk, hyaline or colored above, often carrying the base of the perithecium beyond the tip of the appendage, and consisting of an inner cell next the appendage and two superposed outer ones, the lower of which (secondary stalk-cell) is smaller; the stalk-cell below these wholly united to the stalk-cell of the appendage, rather stout and short, separated from the cells above it by a horizontal septum, which may be slightly oblique or (as in the California variety) strongly oblique, in which case the secondary stalk-cell extends downward beside the stalk-cell so that only the lower third or quarter of the latter is free externally. Stalk-cell of the appendage relatively large, as long as or often longer than that of the perithecium and about half as broad, usually bulging externally, its outer margin usually curved symmetrically from its base to the base of the basal cell; the latter relatively small, deep amber brown, half as long as broad, pointed distally between the antheridium which arises from its inner side and the base of the first fertile cell above it, which, with the other fertile cells, are large and prominent, thick walled, much flattened, and obliquely superposed, distinguished by rather deep constrictions, seven to ten in all, or rarely more (seven to fourteen in the Californian form), the original number being increased by the terminal proliferation of the appendage; the antheridia borne on the inner side of the appendage, their very long but not abruptly differentiated necks extending obliquely upward, appressed in a double series; the upper antheridia often infertile, becoming septate and irregularly swollen. Receptacle relatively short, the two cells nearly equal. Spores  $28 \times 3 \mu$ . Perithecium: venter  $50-90 \times 40-54 \mu$ ; neck  $90-125 \times 15-18 \mu$ ; stalk (basal cells only)  $72-100 \times 25-35 \mu$ . Appendage  $60-100 \mu$ , stalk-cell  $30-45 \mu$ . Receptacle  $70-75 \times 22 \mu$ . Total length to tip of perithecium  $250-360 \mu$ . Specimens on legs often much smaller.

On *Limosina fontinalis* Fallen. Kittery Point, Maine, vicinity of Cambridge, Mass., Berkeley, California. Usually in a dense tuft on the side or near the tip (inferior) of the abdomen and near the base of the posterior pair of legs. The Californian material, from two specimens of the host, differs constantly from the abundant New England material as

noted in the description, as well as from the fact that the venter of the perithecium is longer and less distinctly inflated, while its apex shows no perceptible modification of the lip-cells.

*Stigmatomyces Papuanus* nov. sp.

Venter of the perithecium dark amber brown, relatively small and rather prominently inflated, oval to elliptical; usually not abruptly distinguished distally from the hyaline or yellowish neck, which in well-developed specimens is very elongate, tapering very gradually, in others shorter and stouter; the tip clearly distinguished (abruptly so in the shorter forms), subconical, the posterior lip-cells forming a narrow, subtruncate, slightly recurved apical projection beyond the two laterally placed, papillate, slightly divergent projections of the anterior lip-cells; the basal cells forming a short, stout stalk, separated from the stalk-cell by an oblique septum. Appendage relatively small, resembling that of the *S. Limosinae* in general form, the fertile cells not more than five or six in number, the upper ones separated by constrictions which may be obsolete between the lower ones. Receptacle relatively short, the cells subequal, yellowish. Spores about  $20 \times 2 \mu$ . Perithecium: venter  $50-55 \times 40 \mu$ ; the neck  $90-290 \times 20 \mu$ ; the stalk  $35-45 \times 33-36 \mu$ . Appendage,  $35-45 \mu$ , the stalk-cell  $22-30 \times 14-17 \mu$ . Receptacle  $55-72 \mu$ . Total length to tip of perithecium  $400-485 \mu$ . A few specimens on the legs much smaller.

On three small flies of different species allied to *Limosina*. Ralum, New Pomerania. Perhaps a variety of *S. Limosinae*.

*Arthrorhynchus Cyclopodiae* nov. sp.

Becoming tinged with brownish yellow except the hyaline stalk-cell of the perithecium. Perithecium nearly straight and symmetrical, slightly inflated, usually distinctly constricted in the region of its very small basal cells just above the very large hyaline stalk-cell, which may nearly equal it in length and diameter and is often somewhat enlarged distally: the venter comprising the lower two-thirds, not clearly distinguishable from the neck, which tapers slightly and almost symmetrically, the tip fairly well distinguished above a more or less distinct enlargement, from which it is separated by a slight constriction; the apex consisting of a crown of four nearly symmetrical, distinctly tridentate, erect, or very slightly divergent projections, which are subtended by a corresponding number of slight elevations, the middle lobe of each projection more prominent than

the lateral and like them bluntly rounded. Receptacle consisting of two small cells, the lower twice as large as the upper, which gives rise distally to the stalk-cell and bears the free appendage laterally; the foot an unmodified cell which penetrates the host, dividing below into a very copiously branched system of slender, sinuous, rhizoidal hyphae. Appendage consisting of a dumbbell-shaped, free stalk-cell, the basal half-rounded or flattened, brownish, somewhat larger than the distal portion, which is deeper brown, flattened and inflated, connected by a narrow hyaline isthmus (the lumen of which may become almost obliterated) with the lower half, and mostly broader than the base of the basal cell of the appendage, which is infertile, subrectangular, or somewhat inflated, slightly longer than broad, the lower half of the walls becoming conspicuously modified by a progressive thickening from above downward, the thickened portion deeper brown; the remaining cells of the appendage three to four in number, brownish, successively smaller from below upward, giving the organ a characteristically tapering habit; the two lowest of these cells usually relatively shorter, and bearing each three to four antheridia side by side, distally and externally; those above relatively longer and narrower and producing fewer antheridia, the terminal one spiniferous. Antheridia with slender curved necks. Spores  $60-65 \times 4.5 \mu$ . Perithecium: venter  $325-350 \times 70-90 \mu$ ; the stalk-cell  $220-250 \times 75-80 \mu$ . Appendage,  $100-110 \mu$ , the stalk-cell  $35-40 \times 30-35 \mu$  (the upper half  $\times 28-30 \mu$ ). Receptacle  $55-75 \times 45-50 \mu$ .

On the abdomen of *Cyclopodia macrura* Speiser. New Pomerania. Berlin Museum, No. 854.

The original name given to this genus in 1857 by Kolenati is here retained in preference to the much later one applied to it by Peyritsch in 1873; since however absurd and scientifically worthless the original zoölogical descriptions of these forms may be, there has never been the slightest question as to the generic identity of the organisms studied by these two authors. Neither the descriptions nor the figures given by Kolenati and Diesing are, however, sufficient to render a specific determination possible, so that the name given by Peyritsch to the European species of the genus, although it is undoubtedly a synonym of *A. Diesingii* Kol. or *A. Westrumbii* Kol., or more probably of both, may properly be retained. The new forms here described are very closely allied, differing chiefly in the details of structure in the appendage and the tip of the perithecium, but are very different from *Arthrorhynchus Nycteribae*. Material in my possession obtained from species of *Nycteribia*, from Europe, must, I think, be referred without question to the

last named species ; although the conformation of the tip of the perithecium has apparently been incorrectly reproduced in Peyritsch's plate.

**Arthrorhynchus Eucampsipodae** nov. sp.

Hyaline throughout. Perithecium straight or distally slightly curved, tapering gradually from the middle, or lower, to the broad tip ; the apex consisting of a slight median projection surrounded by a crown consisting of four slightly shorter, broad, blunt, distinctly divergent projections, which show indistinct marks of lobing and are symmetrically placed ; the stalk-cell about one half as long as the perithecium or less. The basal cell of the appendage constricted in the middle as in the preceding species, the lower half irregularly rounded and four or five times as large as the upper half, which is very small, colorless, and less than half as wide as the cell above it ; the fertile cells three in number, the lower bearing four or (?) five antheridia, the upper three in addition to the terminal one, which is furnished with a short hyaline basal spine ; the necks of the antheridia large, tapering, divergent. Receptacle as in the preceding species. Spores about  $45-50 \times 4 \mu$ . Perithecium : venter  $250-325 \times 65-75 \mu$  ; the stalk-cell  $110-150 \times 55 \mu$ . Appendage,  $75-90 \mu$ , the stalk-cell  $35 \times 25$  (the upper half  $\times 10 \mu$ ).

On the abdomen of *Eucampsipoda Hyrtli* Kol., Egypt. Berlin Museum, No. 855.

**Rhizomyces gibbosus** nov. sp.

General habit more or less sigmoid. Perithecium amber brown, concolorous, with its relatively large basal cells, from which it is hardly distinguished, asymmetrically inflated, bent, and tapering somewhat distally ; a subterminal abruptly rounded enlargement, beyond which the short asymmetrical tip is clearly distinguished, bearing a large two-celled outgrowth posteriorly, the lip-cells being otherwise unmodified : stalk-cell hyaline, variably, sometimes greatly elongated, separated from the basal cells by a more or less distinct constriction. Appendage nearly hyaline, except the small deep brown sterile basal cell, the remaining cells, three to seven in number, bearing short one- to two-celled branches distally and laterally on which the free flask-shaped antheridia are borne singly or several together. Receptacle short and stout, the upper cell several times as large as the basal cell, which appears to penetrate the host directly by means of a rhizoidal apparatus. Spores about  $35 \times 3 \mu$ . Perithecium, including basal cells,  $85-108 \times 30-36 \mu$  ; the stalk  $60-160 \times 18-20 \mu$ . Appendage  $65-110 \mu$ . Total length to tip of perithecium  $180-325 \mu$ .

On the upper surface near the tip of the abdomen of a species of *Diopsis*. Berlin Museum, No. 850. Tanga, Africa.

**CERAIOMYCES** nov. gen.

Structure of perithecium as in *Laboulbenia*, its stalk-cell united to the free base of the free stalk-cell of the appendage, which bears a well differentiated basal cell terminally, from the end of which are borne antheridial branches, the successive cells of which produce terminally either successive secondary branchlets or antheridia or both, much as in *Laboulbenia*. Receptacle two-celled.

**Ceraiomycetes Dahlii** nov. sp.

Perithecium large, blackish brown, with an olive shade, becoming opaque, usually slightly curved, tapering gradually to the slender undifferentiated tip; the anterior lip-cells forming two appressed hyaline-tipped finger-like projections; the base very broad, translucent, dull brownish, bulging conspicuously below the venter, especially on the left side; the stalk-cell small, nearly isodiametric, united on its inner side to the base of the stalk-cell of the appendage. The latter free, though often in contact with the base of the perithecium, dull blackish olive, outwardly inflated, narrower terminally where it bears the characteristically differentiated basal cell of the appendage, which becomes almost opaque and is somewhat flask- or bottle-shaped with a rounded extremity, from which, typically, two divergent branches arise which in turn may branch one to three times subdichotomously; the long slender flask-shaped antheridia borne, one to two together, distally from the successive cells. The basal cell of the receptacle nearly spherical, penetrating the host by a long filament which is slender except for an enlargement immediately below the integument of the host, simple at first but becoming more or less copiously branched; the upper cell very large and elongate. Spores about  $30 \times 3 \mu$ . Perithecium  $275-310 \times 55-60 \mu$ ; the base, including the stalk-cell,  $68-72 \times 58-68 \mu$ . Appendage  $75-85 \mu$  (the basal cell  $18 \times 12 \mu$ ), the stalk-cell  $40-45 \times 18-22 \mu$ . Receptacle  $175-240 \times 35 \mu$  (the basal cell  $20-22 \mu$ ). Total length to tip of perithecium  $400-675 \mu$ , average  $550 \mu$ .

On various parts of a small flower fly. Ralum, New Pomerania. Berlin Museum, Nos. 1283 and 1298. Occurring more often on the head, where it might be mistaken for a dipterous antenna.

**Dimeromyces coarctatus** nov. sp.

*Male Individual.* Receptacle nearly hyaline, consisting of usually three superposed cells, the upper separated by a dark-colored constriction

from a short, simple, two- to three-celled hyaline or brownish appendage. The antheridia usually two, seldom three, borne singly from the successive cells of the receptacle, from which they are separated by a small basal cell; the venter having an external depression and not abruptly distinguished from the stout curved neck. Receptacle  $35-45 \times 6-7 \mu$ . Appendage  $25-50 \mu$ . Antheridia  $18 \times 5 \mu$ .

*Female Individual.* Receptacle consisting of a large basal cell about twice as long as broad, bulging so as to form a rounded base which pushes the small brownish-black foot to a lateral or sublateral position; the remaining cells, usually eight or nine in number, separated by horizontal septa and superposed in a simple series; the lower cells greatly flattened, those above somewhat less so, the series ending in a somewhat abruptly narrower terminal cell, which is more than twice as long as broad, subcylindrical, its extremity rounded symmetrically and bearing a short, simple, usually four-celled terminal brownish appendage, which is distinguished by a constricted dark basal septum and terminated by a somewhat inflated lighter larger cell, which becomes characteristically disorganized on one side, so that the appendage appears to end in a slender curved projection. The remaining cells of the receptacle producing single appendages or perithecia, except the basal and sometimes a subbasal cell. The uppermost of these secondary appendages arises from the inner side of the subconical subterminal cell of the receptacle, occupying a position in the median line between the primary appendage and the base of the first perithecium, and consists of a short subconical basal cell, from the narrow extremity of which the simple, several-celled terminal portion is distinguished by a constricted dark septum; the remaining appendages laterally divergent on opposite sides in such a way as to appear paired, usually three on each side, each consisting of a rather long basal cell inflated along its upper side so as to appear more or less geniculate, concolorous with the receptacle, its narrower extremity suffused with dark brown, distinguished without constriction by a dark septum from the simple terminal portion, which is usually five-celled, more or less strongly recurved, brown, its terminal cell becoming inflated and undergoing gelatinous degeneration on the lower side, which causes it to appear split in two, the hook-like upper half of the cell alone persisting in some individuals. Perithecia yellowish, distally brownish, one, rarely two, in number; the first always arising from the cell immediately below that which bears the upper secondary appendage, the second, when one is present, replacing one of the appendages lower down; consisting of a symmetrically inflated venter, which tapers gradually downward, passing into the short stalk; a short neck



rather abruptly distinguished, deeper brown below, its tip inflated below four terminal projections, three or two of which are in the form of rounded papillae of unequal size, and one or two of which are pointed and much more prominent. Spores  $42 \times 3.5 \mu$ . Perithecium, including the stalk, which is continuous with it,  $125 \times 20-35 \mu$ . Receptacle to base of primary appendage  $50-75 \mu$ . Secondary appendages about  $75 \mu$ . Total length to tip of perithecium  $150-180 \mu$ .

Densely crowded on the inferior surface of the abdomen or rarely on the legs of a small pale fly, remarkable for a prominent black spur-like bristle on the posterior legs. Ralum, New Pomerania. Berlin Museum, No. 1282.

***Dimeromyces rhizophorus* nov. sp.**

*Male Individual.* Receptacle consisting of a basal cell which penetrates the host directly without a differentiated foot, and two to three superposed cells above it, each of which usually bears an antheridium, the upper terminated by a short, pointed, slender cell. The antheridia rather short and stout, with short, stout necks. Receptacle about  $50 \times 8 \mu$ . Appendage  $12 \times 3.5 \mu$ . Antheridia  $25 \times 9 \mu$ .

*Female Individual.* More or less deeply tinged with amber brown. Receptacle amber brown, consisting of six superposed cells, the small basal cell, hardly visible above the integument, penetrates the host directly by means of a very large, abruptly furcate rhizoid, the two cells above it similar, broader than long, bearing each an appendage consisting of a basal cell bent toward the receptacle, darker and narrower distally, and separated by a dark septum from the three-celled terminal portion, which is straight or slightly curved, larger toward the middle, the smaller terminal cell becoming partly disorganized. The next (fourth) cell of the receptacle bears the single perithecium; the distal terminal cell longer and narrower, and terminated by a short, pointed, one- sometimes two-celled primary appendage (similar to that of the male individual), from which it is separated by a constriction; the subterminal cell narrower distally, producing on its inner side an appendage similar to those below it, but straight and somewhat shorter. Perithecium with a short stout stalk rapidly expanding into the asymmetrically inflated deeper brown venter of the perithecium; the neck very short and abruptly distinguished; the tip relatively large, four-lobed, inflated with two lateral papillate outgrowths, above which the lips form a subconical projection.

Spores about  $25 \times 3 \mu$ . Perithecium including stalk  $70-90 \times 20-$

25  $\mu$ . Receptacle about  $45 \times 12 \mu$ . Primary appendage 12  $\mu$ ; secondary appendages 35–40  $\mu$ . Penetrating rhizoidal branches  $150\text{--}184 \times 10\text{--}12 \mu$ . Total length to tip of perithecium 90–110  $\mu$ .

On the inferior surface of the abdomen of a small fly. Ralum, New Pomerania. Berlin Museum, No. 1295.

*Dimeromyces crispatus* nov. sp.

*Male Individual.* Receptacle consisting of four superposed hyaline cells, the basal one much longer than the rest combined; the upper bearing distally a two-celled terminal appendage, the lower cell of which is small, the upper elongate, brownish; the two remaining cells of the receptacle producing each a single antheridium. Antheridia superposed, the stalk-cell, neck, and venter well distinguished, the latter symmetrically and considerably inflated, the neck slightly curved. Receptacle  $50 \times 8 \mu$ . Antheridia  $33 \times 8\text{--}9 \mu$ . Appendage 36  $\mu$ .

*Female Individual.* Receptacle consisting of usually five superposed cells, the basal cell very elongate, slender, and hyaline; while of the four remaining cells the two lower are much flattened, broader than long, and separated by oblique septa, the two upper unlike and narrower. Of these four cells the second from below gives rise to the stalk-cell of the perithecium, while the others by successive proliferation produce each a branch consisting of eight or ten obliquely superposed cells; while each of these cells in turn produces a single simple branchlet from its upper side, originally terminal, but becoming lateral through the further proliferation of the cell which bears it; the branchlets distinguished by a slight constriction and a broad dark septum at the base, brown, curved, distally helicoid, slightly enlarged and paler. The primary terminal appendage thus appears as the lowest of the upper series of branchlets, from which it does not differ in structure. Perithecia one to three in number, the first lowest, and always formed from the second from below of the four distal cells of the receptacle, others sometimes arising from each of the two upper distal cells; the stalk hyaline, long and slender, the venter small, narrow, not distinguished from the stalk, becoming brownish, distally slightly inflated, the neck short and well but not abruptly distinguished; the tip well differentiated, hyaline, symmetrical or nearly so, shovel shaped or spatulate, swollen at its base, and tapering to the broad, bluntly rounded or nearly truncate apex. Spores about  $30 \times 3.5 \mu$ . Perithecium:  $70\text{--}75 \times 18 \mu$ , the stalk  $50\text{--}125 \times 15 \mu$ . Receptacle, basal cell  $185\text{--}250 \times 18 \mu$ , the distal portion about 50  $\mu$ . Total

length to tip of perithecium 360–435  $\mu$ . Lateral cell series or branches about 50  $\mu$  long, their branchlets to tip of helix about 50  $\mu$ .

On the legs and superior surface of the abdomen of the same host parasitized by *D. coarctatus*. Ralum, New Pomerania. Berlin Museum, No. 1282.